

III. CLAIM AMENDMENTS

1. (Currently Amended) A method of producing a higher quality electromyographic signal describing myoelectrical activity of an electrically active region of a subject's muscle, comprising:

sensing through an array of electrodes a plurality of EMG signals representative of the myoelectrical activity of the electrically active region of the subject's muscle;

applying a weighting function to the detected EMG signals and thereby producing weighted signals, the electrically active region of the subject's muscle comprising a center and the weighting function containing correction features for the relative locations of the center of the electrically active region and the electrodes; and

combining the weighted signals and thereby producing the higher quality electromyographic signal.

2. (Currently Amended) A method of producing a higher quality electromyographic signal ~~as defined in claim 1,~~ describing myoelectrical activity of an electrically active region of a subject's muscle, comprising:

sensing through an array of electrodes a plurality of EMG signals representative of the myoelectrical activity of the electrically active region of the subject's muscle;

applying a weighting function to the detected EMG signals and
thereby producing weighted signals; and

combining the weighted signals and thereby producing the higher
quality electromyographic signal;

wherein:

the electrically active region of the subject's muscle
comprises a center;

the electrodes are separated from the center of the
electrically active region by respective distances;

the electrodes are separated from each other by an inter-
electrode distance; and

the weighting function comprises correction features for:

- the relative location of the center of the
electrically active region and the electrodes;
- the distance separating the center of the
electrically active region and the electrodes;
- the size of the electrically active region; and
- the inter-electrode distance.

3. (Original) A method of producing a higher quality
electromyographic signal as defined in claim 1, wherein the
weighting function comprises correction features for both
cancellation and distance damping effects.

4. (Currently Amended) A method of producing a higher quality electromyographic signal ~~as defined in claim 1,~~ describing myoelectrical activity of an electrically active region of a subject's muscle, comprising:

sensing through an array of electrodes a plurality of EMG signals representative of the myoelectrical activity of the electrically active region of the subject's muscle;

applying a weighting function to the detected EMG signals and thereby producing weighted signals, the weighting function containing correction features for the relative locations of the electrically active region and the electrodes; and

combining the weighted signals and thereby producing the higher quality electromyographic signal;

wherein the electrically active region of the subject's muscle comprises a center, the array of electrodes comprises a series of electrodes with an inter-electrode distance, each EMG signal is detected through at least two electrodes of the array, and wherein applying the weighting function comprises:

detecting the position of the center of the electrically active region about the array of electrodes;

relating the weighting function to the position of the center of the electrically active region with respect to the electrodes of said series;

weighting each EMG signal by means of the weighting function related to the position of the center of the electrically active region with respect to the electrodes of said series.

5. (Original) A method of producing a higher quality electromyographic signal as defined in claim 4, wherein the series of electrodes has a center, and wherein, when the center of the electrically active region is offset with respect to the center of the series of electrodes:

a larger number of EMG signals are detected by the electrodes on one side of the center of the electrically active region than on the other side of said center of the electrically active region so that EMG signals are missing on said other side; and

weighting of the EMG signals comprises replacing the missing EMG signals on said other side by corresponding EMG signals from said one side and subsequently weighting said replacement EMG signals.

6. (Original) A method of producing a higher quality electromyographic signal as defined in claim 1, wherein combining the weighted signals comprises:

adding a feature of the weighted signals together.

7. (Currently Amended) A method of producing a higher quality electromyographic signal ~~as defined in claim 1,~~ describing myoelectrical activity of an electrically active region of a subject's muscle, comprising:

sensing through an array of electrodes a plurality of EMG signals representative of the myoelectrical activity of the electrically active region of the subject's muscle;

applying a weighting function to the detected EMG signals and thereby producing weighted signals, the weighting function containing correction features for the relative locations of the electrically active region and the electrodes; and

combining the weighted signals and thereby producing the higher quality electromyographic signal, wherein combining the weighted signals comprises calculating a mean of a feature of the weighted signals.

8. (Currently Amended) A method of producing a higher quality electromyographic signal describing myoelectrical activity of an electrically active region of a subject's muscle, comprising:

sensing through an array of electrodes a plurality of EMG signals representative of the myoelectrical activity of the electrically active region of the subject's muscle;

applying a weighting function to the detected EMG signals and thereby producing weighted signals, the weighting function containing correction features for the relative locations of the electrically active region and the electrodes; and

combining the weighted signals and thereby producing the higher quality electromyographic signal;

wherein said method of producing a higher quality electromyographic signal as defined in claim 1, further ~~comprising~~ comprises, prior to combining the weighted signals, evaluating electromyographic quality of the weighted signals.

9. (Original) A method of producing a higher quality electromyographic signal as recited in claim 8, wherein evaluating electromyographic quality comprises applying to the weighted signals quality indexes for detection of at least one of the following parameters:

- signal-to-noise ratio;
- maximum-to-minimum drop in power density;
- power spectrum deformation;
- electrical activity related to electrocardiogram/esophageal peristalsis.

10. (Currently Amended) A method of producing a higher quality electromyographic signal as recited in claim 8, wherein the electrically active region of the subject's muscle comprises a center, and wherein evaluating electromyographic quality comprises adding to each other two of the weighted signals detected through respective electrodes situated on opposite sides of the center of the electrically active region to produce a corresponding addition signal, subtracting said two weighted

signals from each other to produce a corresponding subtraction signal, and comparing said addition and ~~subtraction~~ subtraction signals, said ~~comparision~~ comparison being representative of the electromyographic quality of the weighted signals.

11. (Original) A method of producing a higher quality electromyographic signal as recited in claim 8, further comprising, prior to combining the weighted signals, replacing the weighted signals whose evaluated quality is insufficient.

12. (Original) A method of producing a higher quality electromyographic signal as recited in claim 11, comprising replacing the weighted signals whose evaluated quality is insufficient by predicted values.

13. (Original) A method of producing a higher quality electromyographic signal as recited in claim 11, comprising replacing the weighted signals whose evaluated quality is insufficient by a last value of said weighted signals considered as containing electromyographic information.

14. (Original) A method of producing a higher quality electromyographic signal as recited in claim 8, comprising replacing the higher quality electromyographic signal in response to weighted signals of insufficient quality.

15. (Currently Amended) A system for producing a higher quality electromyographic signal describing myoelectrical activity of an electrically active region of a subject's muscle, comprising:

an array of electrodes for sensing a plurality of EMG signals representative of the myoelectrical activity of the electrically active region of the subject's muscle;

a weighting filter applied to the detected EMG signals to produce weighted signals, the electrically active region of the subject's muscle comprising a center and the weighting filter containing correction features for the relative locations of the center of the electrically active region and the electrodes; and

a combiner of the weighted signals, the combined weighted signals constituting the higher quality electromyographic signal.

16. (Currently Amended) A system for producing a higher quality electromyographic signal ~~as defined in claim 15,~~ describing myoelectrical activity of an electrically active region of a subject's muscle, comprising:

an array of electrodes for sensing a plurality of EMG signals representative of the myoelectrical activity of the electrically active region of the subject's muscle;

a weighting filter applied to the detected EMG signals to produce weighted signals, the weighting filter containing

correction features for the relative locations of the electrically active region and the electrodes; and

a combiner of the weighted signals, the combined weighted signals constituting the higher quality electromyographic signal;

wherein:

the electrically active region of the subject's muscle comprises a center;

the electrodes are separated from the center of the electrically active region by respective distances;

the electrodes are separated from each other by an inter-electrode distance; and

the weighting filter comprises correction features for:

- the relative location of the center of the electrically active region and the electrodes;
- the distance separating the center of the electrically active region and the electrodes;
- the size of the electrically active region; and
- the inter-electrode distance.

17. (Original) A system for producing a higher quality electromyographic signal as defined in claim 15, wherein the weighting filter comprises correction features for both cancellation and distance damping effects.

18. (Currently Amended) A system for producing a higher quality electromyographic signal ~~as defined in claim 15,~~ describing myoelectrical activity of an electrically active region of a subject's muscle, comprising:

an array of electrodes for sensing a plurality of EMG signals representative of the myoelectrical activity of the electrically active region of the subject's muscle;

a weighting filter applied to the detected EMG signals to produce weighted signals, the weighting filter containing correction features for the relative locations of the electrically active region and the electrodes; and

a combiner of the weighted signals, the combined weighted signals constituting the higher quality electromyographic signal;

wherein:

the electrically active region of the subject's muscle comprises a center;

the array of electrodes comprises a series of electrodes with an inter-electrode distance;

each EMG signal is detected through at least two electrodes of the array; and

the weighting filter comprises a weighting function related to the position of the center of the electrically active region with respect to the electrodes of said series.

19. (Currently Amended) A system for producing a higher quality electromyographic signal ~~as defined in claim 15,~~ describing myoelectrical activity of an electrically active region of a subject's muscle, comprising:

an array of electrodes for sensing a plurality of EMG signals representative of the myoelectrical activity of the electrically active region of the subject's muscle;

a weighting filter applied to the detected EMG signals to produce weighted signals, the weighting filter containing correction features for the relative locations of the electrically active region and the electrodes; and

a combiner of the weighted signals, the combined weighted signals constituting the higher quality electromyographic signal;

- wherein the series of electrodes has a center, wherein the electrically active region of the subject's muscle has a center, and wherein, when the center of the electrically active region is offset with respect to the center of the series of electrodes:

a larger number of EMG signals are detected by the electrodes on one side of the center of the electrically active region than on the other side of said center of the

electrically active region so that EMG signals are missing on said other side; and

the system comprises means for replacing the missing EMG signals on said other side by corresponding EMG signals from said one side, and means for subsequently weighting said replacement EMG signals.

20. (Currently Amended) A system for producing a higher quality electromyographic signal ~~as defined in claim 15,~~ describing myoelectrical activity of an electrically active region of a subject's muscle, comprising:

an array of electrodes for sensing a plurality of EMG signals representative of the myoelectrical activity of the electrically active region of the subject's muscle;

a weighting filter applied to the detected EMG signals to produce weighted signals, the weighting filter containing correction features for the relative locations of the electrically active region and the electrodes; and

a combiner of the weighted signals, the combined weighted signals constituting the higher quality electromyographic signal;

- wherein the combiner comprises:

an adder of a feature of the weighted signals.

21. (Currently Amended) A system for producing a higher quality electromyographic signal ~~as defined in claim 15,~~ describing myoelectrical activity of an electrically active region of a subject's muscle, comprising:

an array of electrodes for sensing a plurality of EMG signals representative of the myoelectrical activity of the electrically active region of the subject's muscle;

a weighting filter applied to the detected EMG signals to produce weighted signals, the weighting filter containing correction features for the relative locations of the electrically active region and the electrodes; and

a combiner of the weighted signals, the combined weighted signals constituting the higher quality electromyographic signal;

- wherein the combiner comprises:

a calculator of a mean of a feature of the weighted signals.

22. (Currently Amended) A system for producing a higher quality electromyographic signal describing myoelectrical activity of an electrically active region of a subject's muscle, comprising:

an array of electrodes for sensing a plurality of EMG signals representative of the myoelectrical activity of the electrically active region of the subject's muscle;

a weighting filter applied to the detected EMG signals to produce weighted signals, the weighting filter containing

correction features for the relative locations of the electrically active region and the electrodes; and

a combiner of the weighted signals, the combined weighted signals constituting the higher quality electromyographic signal;

- wherein said system for producing a higher quality electromyographic signal ~~as defined in claim 15,~~ further ~~comprising~~ comprises, prior to combining the weighted signals, an evaluator of an electromyographic quality of the weighted signals.

23. (Original) A system for producing a higher quality electromyographic signal as recited in claim 22, wherein the evaluator comprises means for applying to the weighted signals quality indexes for detection of at least one of the following parameters:

- signal-to-noise ratio;
- maximum-to-minimum drop in power density;
- power spectrum deformation;
- electrical activity related to electrocardiogram/esophageal peristalsis.

24. (Currently Amended) A system for producing a higher quality electromyographic signal as recited in claim 22, wherein the electrically active region of the subject's muscle comprises a center, and wherein the evaluator comprises an adder of two of the weighted signals detected through respective electrodes

situated on opposite sides of the center of the electrically active region to produce a corresponding addition signal, a subtractor of said two weighted signals from each other to produce a corresponding subtraction signal, and a comparator of said addition and ~~subtraction~~ subtraction signals, this ~~comparision~~ comparison being representative of the electromyographic quality of the weighted signals.

25. (Original) A system for producing a higher quality electromyographic signal as recited in claim 22, further comprising means for replacing, prior to combining the weighted signals, the weighted signals whose evaluated quality is insufficient.

26. (Original) A system for producing a higher quality electromyographic signal as recited in claim 25, comprising means for replacing the weighted signals whose evaluated quality is insufficient by predicted values.

27. (Original) A system for producing a higher quality electromyographic signal as recited in claim 25, comprising means for replacing the weighted signals whose evaluated quality is insufficient by a last value of said weighted signals considered as containing electromyographic information.

28. (Original) A system for producing a higher quality electromyographic signal as recited in claim 22, comprising means for replacing the higher quality electromyographic signal in response to weighted signals of insufficient quality.